

REMARKS

Claims 15-30 are pending in this application. Claims 15-30 are believed to be distinguishable over the cited prior art. As a result, no claim is amended herein. Therefore, entry of the foregoing arguments and remarks is proper under 37 C.F.R. §1.116(b).

In response to Applicants' earlier arguments against the rejection of claims 15-23 under 35 U.S.C. §103(a) as being unpatentable over Howell et al., U.S. Patent No. 6,047,772, in view of Hamada, U.S. Patent No. 5,960,128 for reasons stated on pages 4-6 of the previous Office Action (Paper No. 15), the Examiner has now rejected all pending claims 15-30 under 35 U.S.C. §103(a) as being unpatentable over a completely different combination of prior art references, i.e., what the Examiner now alleges as "Applicant's Admitted Prior Art" in view of newly cited art, Endsley et al., U.S. Patent No. 6,005,613 for reasons stated on pages 3-5 of the final Office Action (Paper No. 17).

Specifically, in support of the base claims 15, 21 and 25, the Examiner alleges that "Applicant's Admitted Prior Art" discloses an image processing apparatus comprising:

"an imaging optical system for forming an image of an object on an imaging surface (e.g., page 1, lines 9-13);

a color imaging device including photo-detectors and a color filter arranged on the imaging surface in two-dimensions, for performing photoelectric conversion of the image of the object formed by the imaging optical system (e.g., Fig. 4A; page 2 lines 14-19);

shift drive means for shifting the imaging optical system and the photo-detectors relative to each other (e.g., FIGs. 4B and 4D; page 3, lines 2-14; page 4, lines 6-15);

a control unit for generating single synthesized image data using image data of the image of the object obtained through selected

only one color of the color filter of the color imaging device, and image data of the image of the object obtained through the selected only one color of the color filter when the imaging optical system and the photo-detectors are shifted relative to each other by the shift drive means by a distance corresponding to a predetermined pitch on the imaging surface in a predetermined direction (e.g., page 3, lines 11-14; page 4, lines 11-15)."

The Examiner then admits that "Applicant's Admitted Prior Art" does **not** disclose "the control unit includes output means for outputting the single synthesized image data as single monochromatic image data." However, the Examiner cites column 5, lines 43-47; column 6, lines 3-14 of Endsley '613, as a secondary reference, for allegedly disclosing "a camera with multiple output modes wherein a user can easily switch between a color image and a monochromatic image" in order to support an assertion that "it would have been obvious ... to have used Endsley's method of switching color modes in order to easily switch between a color image and a monochromatic image" in order to arrive at Applicants' base claims 15, 21 and 25.

However, the Examiner's allegation of what "Applicant's Admitted Prior Art" discloses is factually flawed. Equally importantly, the Examiner's assertion of what Endsley '613 discloses is also incorrect. Neither of what the Examiner alleges as "Applicant's Admitted Prior Art" nor Endsley '613, whether taken individually or in combination, discloses key features of Applicants' base claims 15, 21 and 25, including, for example, the "single synthesized image data ... generated by one color image and the same color image obtained by shifting by a distance corresponding to a predetermined pitch on the imaging surface in a predetermined direction, and that such "single synthesized image data ... output as single monochromatic image data". Therefore, Applicants respectfully traverse the rejection and request the Examiner to reconsider and withdraw this rejection for the following reasons.

As described on page 6, lines 5-8 of Applicants' specification, the purpose of Applicants' disclosed invention is to provide an image processing apparatus and method for generating a monochromatic image of high resolution in a short time using the image shift scheme. In order to achieve that purpose, a plurality of image data of only one color (for example, green) are obtained by shifting an image of an object by a predetermined pitches. The plurality of image data of one color are then synthesized to form and output a single monochromatic image data of high resolution.

For example, base claim 15 defines an image processing apparatus comprising, *inter alia*:

a control unit for generating **single synthesized image data** using image data of the image of the object obtained through selected only one color of the color filter of the color imaging device, and image data of the image of the object obtained through the selected only one color of the color filter when the imaging optical system and the photo-detectors are shifted relative to each other by the shift drive means by a distance corresponding to a predetermined pitch on the imaging surface in a predetermined direction;

wherein the control unit includes output means for outputting the single synthesized image data as single monochromatic image data.

Likewise, independent claim 25 defines the same image processing apparatus in terms of means-plus-function clauses.

As expressly defined in base claims 15 and 25, two image data (a) and (b) of only one color are synthesized to generate single monochromatic image data of the only one color, including:

- (a) an image data of the image of the object obtained through selected only one color of the color filter of the color imaging device, and
- (b) an image data of an image of the object obtained through the above-selected only one color of the color filter when the imaging optical system and the photo-detectors are shifted relative to each other by the

shift drive means by a distance corresponding to a predetermined pitch on the imaging surface un a predetermined direction.

In addition, "the control unit" is provided with "output means for outputting the single synthesized image data as a single monochromatic image data". As a result, the monochromatic image data of high resolution can be advantageously obtained using the color imaging device.

Similarly, base method claim 21 defines an image processing method comprising:

forming an image of an object on an imaging surface of a color imaging device by an imaging optical system;

extracting **first image data** of the image of the object of a selected only one color from the image of the object formed on the imaging surface;

shifting the image of the object formed on the imaging surface by a distance corresponding to a predetermined pitch on the imaging surface in a predetermined direction;

extracting **second image data** of the image of the object of the selected only one color from an image of the object obtained after shifting is performed;

synthesizing the first and second image data to generate **single synthesized image data**;

outputting the single synthesized image data as **single monochromatic image data**.

Again, the synthesized image data is obtained by synthesizing the first image data of the image of the object of a selected only one color from the image of the object formed on the imaging surface, and the second image data of the object obtained after shifting is performed. As a result, the monochromatic image data of high resolution can be advantageously obtained using the color imaging device.

The Examiner cites page 3, lines 11-14 and page 4, lines 11-15 of Applicants' specification for allegedly disclosing "a control unit for generating **single synthesized image data using image data of the image of the object obtained**

through selected only one color of the color filter of the color imaging device, and
image data of the image of the object obtained through the selected only one color of
the color filter when the imaging optical system and the photo-detectors are shifted
relative to each other by the shift drive means by a distance corresponding to a
predetermined pitch on the imaging surface in a predetermined direction” as defined
in Applicants' base claims 15, 21 and 25.

However, this citation is misplaced. The cited page 3, lines 11-14 of Applicants' specification only refers to FIG. 4B in which “only the green (G) portions of the two image data thus acquired are extracted thereby to generate a single image composed of the green (G) portions.” Likewise, the cited page 4, lines 11-15 of Applicants' specification only refers to FIG. 4D in which, for green (G), “eight image data having different relative portions of the color imaging device and the object image are acquired, and a single image data having only the (G) portion is generated.”

Both FIG. 4B and FIG. 4D are part of a sequence of specific steps from FIG. 4A – FIG. 4B – FIG. 4C – FIG. 4D – FIG. 4D, in which a monochromatic image is acquired using a plurality of color images generated by a conventional image shift technique. First, individual high-resolution images of three colors RGB are obtained by the image shift technique, and then a black-and-white monochromatic image data is generated by combining or synthesizing all three-color image data in the same position of three colors RGB, as described on page 4, line 28 to page 6, line 3 of Applicants' specification. As a result, while the monochromatic image is obtained, extra time of calculation is required because all 16 images are picked up at the same time for the three colors at each position. Therefore, “additional calculation time for

generating a black-and-white monochromatic image is required for the acquisition of a three-color monochromatic image" as described on page 6 of Applicants' specification.

There is **no** disclosure anywhere in the cited page 3, lines 11-14 and the cited page 4, lines 11-15 of Applicants' specification of Applicants' claimed "control unit for generating single synthesized image data using image data of the image of the object obtained through selected only one color of the color filter of the color imaging device, and image data of the image of the object obtained through the selected only one color of the color filter when the imaging optical system and the photo-detectors are shifted relative to each other by the shift drive means by a distance corresponding to a predetermined pitch on the imaging surface in a predetermined direction" as defined, for example, in Applicants' base claims 15, 21 and 25.

Simply, the cited page 3, lines 11-14 and the cited page 4, lines 11-15 of Applicants' specification do **not** disclose or suggest any technique of synthesizing only one color image and another same color image obtained by shifting by a predetermined distance to output the synthesized one color image as a monochromatic image as expressly defined in each of Applicants' base claims 15, 21 and 25. According to Applicants' base claims 15, 21 and 25, a plurality of image data of only one color (for example, green) are obtained by shifting an image of an object by a predetermined pitches. The plurality of image data of one color are synthesized to form and output a single monochromatic image data of high resolution.

Moreover, as a secondary reference, Endsley '613 does **not** remedy the noted deficiencies of what the Examiner alleges as "Applicant's Admitted Prior Art" in

order to arrive at Applicants' claims 15, 21 and 25. This is because Endsley '613 only discloses a multi-mode digital camera with a computer interface, as shown in FIG. 1, in which the camera is operable in two modes of operation, still capture mode and motion capture mode, and the user is allowed to select operation between a host computer and the camera.

In Endsley '613, the capture mode includes a continuous mode and a single-shot mode. The color mode includes a color mode and a monochrome mode, as shown in Table 12 in column 5. The monochrome mode and the color mode are described in Table 3 in column 8 and from column 5, line 43 to column 8, line 6. According to Endsley '613, the continuous mode (configuration 0) is used first. In the case, the monochrome images are sent with 320X240 green pixels. The monochrome motion image is twice the frame rate of the color image.

On the other hand, as described in lines 58-62 of column 7, a color image is captured with 320x240 green pixels and 160x120 red and blue pixels. The number of pixels (the number of data) of monochrome motion image is half (1/2) of that of the color image. In other words, monochrome image is outputted with half (1/2) of the number of pixels of the color image. Accordingly, the monochrome image can be outputted half (1/2) the frame rate of the color image with half (1/2) the resolution of the color image, and, as a result, can be transferred at high speed.

In addition, the monochrome image according to Endsley '613 is only the green color to transfer at high speed by reducing the resolution to half (1/2) of the color image. In particular, using the crop value parameter, the selected starting and ending lines and pixels may be used to "crop" the image before being transferred in order to reduce the amount of data that has to be sent. See column 5, lines 48-52 of

Endsley '613. As a result, the monochrome image can be transferred at high speed (high frame rate) with low resolution.

However, Endsley '613 does **not** disclose or suggest any concept or technique to generate a monochromatic image of high resolution in a short time using the image shift scheme, as described by Applicants' disclosed invention.

Therefore, even if the digital camera with features of Endsley '613 is to be incorporated into what the Examiner alleges as "Applicant's Admitted Prior Art" in the manner suggested by the Examiner, the Examiner's proposed incorporation still will not arrive at Applicants' base claims 15, 21 and 25, since neither Endsley '613 nor what the Examiner alleges as "Applicant's Admitted Prior Art" discloses or suggests the object of the present invention, that is, to generate a monochromatic image of high resolution in a short time using the image shift scheme.

In order to establish a *prima facie* case of obviousness under 35 U.S.C. §103, the Examiner must show that (1) the prior art reference (or references when combined) must teach or suggest all the claim limitations; (2) there is some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skilled in the art, to modify the reference or to combine reference teachings; and (3) there is a reasonable expectation of success when the reference teachings are combined. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and **not** based on Applicants' disclosure. In re Vaeck, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991). See MPEP 2143. In addition, all the claim limitations must be taught or suggested by the prior art. In re Royka, 490 F.2d 981, 180 USPQ 580 (CCPA 1974). "Obviousness cannot be established by

combining the teachings of the prior art to produce the claimed invention, absent some teaching, suggestion or incentive supporting the combination." ACS Hospital System, Inc v. Montefiore Hospital, 732 F.2d 1572, 1577, 221 USPQ 929, 933 (Fed. Cir. 1984). The Examiner must point to something in the prior art that suggests in some way a modification of a particular reference or a combination of references in order to arrive at Applicants' claimed invention. Absent such a showing, the Examiner has improperly used Applicants' disclosure as an instruction book on how to reconstruct the prior art in an impermissible hindsight fashion to arrive at Applicants' claimed invention. Moreover, any deficiencies in the cited references cannot be remedied with conclusions about what is "basic knowledge" or "common knowledge". See In re Lee, 61 USPQ 2d 1430 (Fed. Cir. 2002).

In the present situation, both what the Examiner alleges as Applicant's Admitted Prior Art" and Endsley '613 fail to disclose or suggest key features of Applicants' base claims 15, 21 and 25. In addition, there is no suggestion anywhere in the cited prior art to support the combination of references in order to arrive at Applicants' claimed invention. Therefore, Applicants respectfully request that the rejection of Applicant's base claims 15, 21 and 25 and their respective dependents be withdrawn.

Claims 16-20, 22-24 and 26-30, which depend from claims 1, 21 and 25, are deemed patentable from claims 1, 21 and 25 if their parent claims 1, 21 and 25 are patentable. Hartness Int'l, Inc., v. Simplicatic Eng'g Co., 891 F.2d 1100, 1108, 2 USPQ2d 1826, 1831 (Fed. Cir. 1987); In re Abele, 684 F.2d 909, 214 USPQ 682, 689 (CCPA 1982) see also In re Sernaker, 702 F.2d 989, 991, 217 USPQ 1, 3 (Fed. Cir. 1983).

Even assuming *arguendo* that independent claims 1, 21 and 25 are not patentable under 35 U.S.C. §102, which Applicants do not believe, claims 16-20, 22-24 and 26-30 are separately patentable from parent claims 1, 21 and 25 for reasons presented herein below.

For example, dependent claims 16 and 27 further define that “the color filter includes three types of color portions arranged according to a Bayer scheme”. No where in either what the Examiner alleges as “Applicant’s Admitted Prior Art” or Endsley ‘613, and the Examiner has **not** addressed any where in the final Office Action (Paper No. 17), is there any disclosure from the Examiner’s proposed combination of Applicants’ claimed “the color filter includes three types of color portions arranged according to a Bayer scheme” as defined in Applicants’ claims 16 and 27.

Dependent claims 17, 18, 27 and 28 further define that “the predetermined pitch is a distance corresponding to $1/n$ (n is an integer) of a pixel on the imaging surface” and the “control unit repeats shifting by the distance corresponding to $1/n$ (n : integer) of the pixel in the imaging surface”. Again, no where in either what the Examiner alleges as “Applicant’s Admitted Prior Art” or Endsley ‘613, and the Examiner has **not** addressed any where in the final Office Action (Paper No. 17), is there any disclosure from the Examiner’s proposed combination of Applicants’ claimed “predetermined pitch is a distance corresponding to $1/n$ (n is an integer) of a pixel on the imaging surface” and claimed “control unit repeats shifting by the distance corresponding to $1/n$ (n : integer) of the pixel in the imaging surface” as defined in Applicants’ claims 17, 18, 27 and 28.

In view of the foregoing explanations, and in view of the fact that the Examiner's proposed combination utterly fails to disclose and suggest key features of Applicants' dependent claims 16-20, 22-24 and 26-30, Applicants respectfully requests that the rejection of dependent claims 16-20, 22-24 and 26-30 be withdrawn.

In view of the foregoing amendments, arguments and remarks, all claims 15-30 are deemed to be allowable and this application is believed to be in condition to be passed to issue. Should any questions remain unresolved, the Examiner is requested to telephone Applicants' attorney at the Washington DC area office at (703) 312-6600.

INTERVIEW:

In the interest of expediting prosecution of the present application, Applicants respectfully request that an Examiner interview be scheduled and conducted. In accordance with such interview request, Applicants respectfully request that the Examiner, after review of the present Amendment, contact the undersigned local Washington, D.C. area attorney at the local Washington, D.C. telephone number (703) 312-6600 for scheduling an Examiner interview, or alternatively, refrain from issuing a further action in the above-identified application as the undersigned attorneys will be telephoning the Examiner shortly after the filing date of this Amendment in order to schedule an Examiner interview. Applicants thank the Examiner in advance for such considerations. In the event that this Amendment, in and of itself, is sufficient to place the application in condition for allowance, no Examiner interview may be necessary.

To the extent necessary, Applicants petition for an extension of time under 37 CFR §1.136. Please charge any shortage of fees due in connection with the filing of this paper, including extension of time fees, to the Deposit Account of Antonelli, Terry, Stout & Kraus, No. 01-2135 (Application No. 500.40886X00), and please credit any excess fees to said deposit account.

Respectfully submitted,

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